Honors Biology Name _____
Lab Date _____

Null Hypothesis

The ***null hypothesis***, aka H_0 or no-difference hypothesis, is a statistical hypothesis that is tested for possible rejection under the assumption that it is true. The null hypothesis states…

- that there is no significant difference between two sets of data
  OR
- that a variable has no significant effect on the outcome.

Alternative Hypothesis

The hypothesis contrary to the null hypothesis is known as the ***alternative hypothesis***.
The alternative hypothesis, H_a, is a statement of what a statistical hypothesis test is set up to establish. The H_a is the hypothesis used in statistical testing that is contrary to the null hypothesis.

Example: Does the concentration of CO_2 affect the rate of photosynthesis?

H_0 → The concentration of CO_2 has no effect on the rate of photosynthesis.
H_a → As the concentration of CO_2 increases, the rate of photosynthesis increases.

Example: Does eating sugar contribute to hyperactivity in children?

H_0 → Hyperactivity in children is unrelated to eating sugar.
H_a → More sugar consumption leads to increased hyperactivity in children.

The null hypothesis is important because it can be tested and found to be false. In the hyperactivity example if the H_0 is tested and found to be false, then a connection between hyperactivity and sugar ingestion may be indicated.

Conclusion

The final conclusion once the test has been carried out is always given in terms of the null hypothesis. We either "Reject H_0" or "Do not reject H_0"; we *never* conclude "Reject H_a", or even "Accept H_a".

If we conclude "Do not reject H_0", this does not necessarily mean that the null hypothesis is true; it only suggests that there is not sufficient evidence against H_0 in favor of H_a. On the other hand, rejecting the null hypothesis suggests that the alternative hypothesis *may* be true.